The Control of Chemical and Biological Weapons

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I. Introduction

Arms control is an extension of defense policy. It consists primarily of striking bargains with potential adversaries with the aim of preventing or containing armed conflicts. (Experience teaches that little faith should be placed on promises during the exigencies of actual conflict, although even combatants may still share enough common goals to sustain some tacit agreements.) Insofar as chemical and biological weapons,[1] in the present state of their technological development, are so overshadowed by nuclear weapons, the prevention of strategic nuclear war must be counted as a superordinate aim of all national policy, including the regulation of other weapons systems. In addition, the prestige and

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1 Chemical weaponry (CW) and biological weaponry (BW) are often confused in newspaper headlines. ("Weaponry" is used here to indicate either the actual hardware or its application in combat.) BW refers to the use of living organisms (usually bacteria or viruses) with the intention of disabling or killing an enemy by causing disease. The hallmark of this effect is the multiplication of the infecting organisms in the target individual. The concept can be readily generalized to include crops as well as human targets. Presumably, cavalry or other large animals are not within the traditional concept of biological warfare agents. New technological developments may arise—e.g., bacteria capable of attacking metal or fuels—that may be subject to ambiguous interpretation.

So much human misery is the consequence of natural infectious disease that the military usefulness of BW may be exaggerated. Fortunately, there are grave difficulties in assuring reliable, prompt, and widespread damage to a target; on the other hand, infections may spread elsewhere. At the present stage of its development, therefore, BW offers precarious if any advantages over conventional weapons for planned military operations. Its main use might be for destruction of crops or for surprise attacks on cities, doubtless most effectively in conjunction with a nuclear attack.

CW consists simply of toxic compounds used for hostile effect. Compounds like nerve gas can kill within a few minutes, with very small doses. However, unlike BW, the chemical does not multiply in the body, nor does it spread progressively in epidemic fashion. CW has well-proven tactical applications and, unlike BW, is supported by long experience and well-developed military doctrine. However, gas masks and, to some extent, antidotes are available for tactical defense. Some military theorists conscientiously forecast the waging of war with less human suffering by the use of incapacitating chemicals in place of lethal bullets. Until the bullets are removed from the armamentarium, however, the argument is immaterial.

The gory details of BW and CW are well described in the authorities cited throughout this text, but this type of argumentation dismisses the horrors of conventional weapons which are hardly more beneficent for being so familiar.

moral force of aspirations for CBAC (chemical and biological arms control) help mobilize advocates of subordinate aims. These include efforts to minimize the cruelty of war for civilians, to disconnect advanced science and technology from warfare, or to influence the momentary military policy of the country in a tactical theater, namely Vietnam. These impulses in turn may have an indirect influence on the strategic aim of preventing nuclear war, or at least on efforts to disengage the United States from a range of ventures whose bearing on essential security interests is contested.

Many national policies suffer from contradictions of short-term versus long-term, or of tactical versus strategic impact, and CBAC is no exception. Thus, some of the motivation for CBAC is the weakening of the military capability of American forces, which is believed to encourage dangerous entanglements—this approach can be fairly labeled "unilateral disarmament." The efforts to separate chemical arms control from biological arms control, justified as a means of promoting the long-term goal of preventing a technology race in biological weaponry (BW), have been criticized for weakening the pressures to also contain tactical chemical weaponry (CW) capabilities.

Finally, a word on moral arguments and on international law: it is this author's view that warfare is the ultimate abnegation of both morality and law, and will remain so until effective international authority, with police powers, has evolved. Moral considerations regarding the use of one versus another method of homicide are assumed to be trivial in contrast to the success of overall policy in preventing large-scale conflict.

This article will focus on contemporary developments in CBAC, mainly since 1969. The historical and technical aspects of CBW (chemical and biological weaponry) are dealt with fully elsewhere[2] and will be developed here only so far as necessary to illuminate current diplomatic and political trends.

II. Historical Development

A. *The Geneva Protocol of 1925*

The movement for CBAC received its principal impetus from the startling development of CW technology by all sides in the course of World

[2] *See, e.g.*, Carnegie Endowment for International Peace, The Control of Chemical and Biological Weapons (1971) [hereinafter cited as Carnegie Endowment]; Stockholm International Peace Research Institute, The Problem of Chemical and Biological Warfare (1971) [hereinafter cited as SIPRI]; World Health Organization, Health Aspects of Chemical and Biological Weapons (1970) [hereinafter cited as World Health Organization]; *Hearings on Chemical-Biological Warfare: U.S. Policies and International Effects Before the Subcomm. on National Security Policy and Scientific Developments of the House Comm. on Foreign Affairs*, 91st Cong., 1st Sess. (1970) [hereinafter cited as *CBW Hearings*].

War I.[3] The fact that the Imperial German Army had taken the first steps in the military use of poison gas was an important part of anti-German *Schrecklichkeit*[4] propaganda. The defeated Central Powers were forced to renounce CW in the Versailles Treaty, and the continued characterization of such warfare as a German atrocity fueled the persistent diplomatic efforts to ban CW, which culminated in the Geneva Protocol of 1925.

In 1922, the Washington Disarmament Conference had produced a treaty which, although ratified by the United States Senate, was rejected by France because of certain provisions concerning submarine armaments. Consequently, the treaty never achieved the status of a legally binding instrument.

A conference on the international arms trade, sponsored in 1925 by the League of Nations, drafted, at the instance of the United States, a separate CBAC treaty, the Geneva Protocol of 1925.[5] The language of the 1925 Protocol stemmed directly from the 1922 disarmament treaty. On this occasion, however, the United States Senate withheld its constitutionally required consent—a situation that has, for varying reasons, prevailed up to the present time. Nevertheless, the Protocol is binding on the 85 countries that had, as of 1970, ratified or acceded to it.

The Protocol successfully passed its major test during World War II, which saw no significant use of CW or BW despite the fact that neither Japan nor the United States was a party to the treaty. One may question, however, whether it was the moral force of the Protocol, or, instead, the fear of mutual retaliation and the unpredictable consequences of unleashing CBW on a large scale, which restrained the belligerents,[6] especially in view of the fact that many weightier and equally solemn agreements, e.g., those relating to the protection of non-combatants, were systematically violated.

The actual text of the Protocol is rife with confusion, on philosophical as well as technological grounds.[7] Its preamble asserts that the use of gases is already "justly condemned by the general opinion of the civilised world" and that this proscription is already part of international common law. On the other hand, the treaty text binds the parties only as

[3] In 1918, CW comprised more than 20 percent of the artillery munitions, and was responsible for 15 percent of the combat casualties (but only for 1.4 percent of the deaths), both sides having planned for rapid increases as fast as productive facilities would allow. (These figures have been derived by the author from data presented in SIPRI, *supra* note 2, at 36, 128–30.)

[4] "Atrocity," as in the allegations of German cruelty to Belgian civilians in World War I.

[5] Excerpts from the Geneva Protocol of 1925 are reprinted in the Appendix, *infra*.

[6] F. BROWN, CHEMICAL WARFARE—A STUDY IN RESTRAINTS (1968) [hereinafter cited as BROWN].

[7] ANN & A. J. THOMAS, JR., LEGAL LIMITS ON THE USE OF CHEMICAL AND BIOLOGICAL WEAPONS: INTERNATIONAL LAW 1899–1970, at 74–78 (1970).

between themselves. Furthermore, most of the parties, following the lead of France, have specifically reserved the right to use chemical weapons "in regard to any enemy state whose armed forces or whose allies fail to respect the prohibitions."[8]

These legal reservations, together with the World War II experience with successful exchanges of deterrent signals, point to the Protocol as the centerpiece of a pragmatically successful system of mutual deterrence. However, that system is also founded on the continuation of a retaliatory capability by the principal parties. That is, the Protocol, far from having abolished chemical weapons, has encouraged the development of increasingly lethal ones and their stockpiling in larger and larger quantities by several of the superpowers.

Until and through World War II, biological weapons had not achieved a status of military credibility. A significant level of research and development of biologicals was originally impelled by American fears that Nazi military technology might uncover some secret weapon for which we would be unprepared. Since World War II, however, substantial investments in BW research by the United States Army have been sufficiently successful to be the subject of impassioned testimony in support of such research before congressional appropriations committees.[9] There is every expectation that the Soviet Union has made similar investments in a political climate that demands less public ventilation of military research programs.

The contemporary focus on problems of CW and BW is the product of at least three trends: The general framework of negotiated arms control agreements in the process of geopolitical stabilization; public reaction to the use of nonlethal chemical weapons in Vietnam; and the dramatic developments in molecular biology in the post-war era which have sharpened the two-edged sword of the modification of microorganisms either for medical or for military purposes.

Both the successes and the shortcomings of major strategic arms control agreements have helped to further progress with CBAC. The successes have strengthened the hand, in domestic debates, of arms control advocates. The failures may have led the superpowers to explore more assiduously those areas where agreements could be reached so as to placate criticisms from the nonaligned countries.

B. *From Geneva to Vietnam*

In the interval between the signing of the Geneva Protocol in 1925 and the beginning of the Vietnam War in 1962, CBW had few uses, none

[8] *Id.* at 78.

[9] S. HERSH, CHEMICAL AND BIOLOGICAL WARFARE—AMERICA'S HIDDEN ARSENAL (1968) [hereinafter cited as HERSH].

of them particularly contributory to military objectives.[10] The principal exception was Mussolini's use of mustard gas in Ethiopia in 1936, an action widely condemned as an egregious barbarism in a war of naked aggression. The Fascists admitted the use of gas, but claimed: (1) they were not fighting a war; and (2) they had a right of reprisal against decapitations and other atrocities by the Ethiopian tribesmen. There are also numerous reports of Japanese experiments with CW in the invasion and occupation of China from 1937 to 1945. However, the mutual restraint in use of CBW in World War II overshadowed these exceptions. In the European theater, Allied air superiority both deterred the Nazis' use of nerve gas, and gave ample scope to high explosives for the Allied destruction of German industry. In the Pacific theater, events were overtaken by the atomic bomb.

The period of the Cold War was marked by extensive research and development and stockpiling, including the capture and retention on both sides of large stocks of German nerve gas, discovered by the Allies only after Hitler's collapse. There have also been indications of isolated uses of CBW in this period. The Chinese made unsubstantiated allegations of American deployment of BW (infected fleas) in the Korean War. Fairly persuasive documentation has been recorded of the use of mustard gas by Egyptian forces during their intervention in Yemen (1963–67). The source of these weapons has not been authenticated, although they might have been Chinese, or Russian, or World War II munitions left behind by the British forces.

Sporadic proposals for CBAC were stifled, before they could gain much currency, by the problem of verification, which already loomed as the central obstacle to the control of nuclear armaments. The United States remained a nonsignatory to the Geneva Protocol more for lack of any stimulus to attract the attention and interest of policy-makers than on account of any studious opposition to it. However, one anti-CBAC argument maintained that any formal restraint on American investment in CBW (even as feeble as the Protocol) would be disadvantageous in the face of Soviet secrecy about their stockpiles. Furthermore, it was argued, the Protocol would hinder the elaboration of one element of potential NATO policy, namely the deployment and use of CW in the defense of Germany against an expected Soviet attack.[11] During this period, NATO military thinking was preoccupied with the assumed numerical preponderance of the Warsaw Pact armies.

[10] Alleged, and sometimes confirmed, instances of the use of CW and BW, including those referred to in the following two paragraphs, are critically reviewed in the SIPRI series, *supra* note 2.

[11] The most precise articulation of these arguments in the open literature is by H. Swyter in *CBW Hearings*, *supra* note 2.

The introduction of defoliants and tear gas around 1963–64,[12] by American forces in Vietnam, reopened CW as a major issue of controversy, fueled above all by the bitter domestic conflict over the legitimacy of the war itself. In order to avoid the moral opprobrium of "chemical warfare," the protagonists went to great lengths to analyze the Geneva Protocol—did it, or did it not, forbid the use of nonlethal harassing agents (tear gas) and anti-plant agents? The center of the debate consequently shifted from proposals for multilateral CBAC, in which the national interests of the United States would be balanced against those of other superpowers, to cultivation of domestic restraints on military capability, leading to unilateral reductions of technological force, as a curb on what appeared to be the United States' arrogant use of power. The involvement of the United States in Vietnam thus confounded efforts to augment international arms control on the *lethal* chemical and biological weapons—weapons which had not been deployed in Vietnam!

Broader interest in CW was prompted by the Skull Valley, Utah, incident in March, 1968. The accidental release of nerve gas from the Dugway Proving Grounds of the United States Army led to the death of some six thousand sheep. The Army's credibility was impaired by early denials of responsibility, which may have been based in part on ignorance of the susceptibility of sheep to this agent. It soon became evident that secret research and testing of CW was a potential hazard to civilian health which had not been adequately monitored by or even revealed to responsible public health officials. And if such lapses were possible with CW, what might result from breakouts of contagious biological weapons, designed to initiate epidemics that would be difficult to control?

The journalistic work of Seymour Hersh,[13] and the legislative efforts of Representative Richard D. McCarthy,[14] joined by Senator Gaylord Nelson and many others, brought these problems to much wider attention during 1968–69.[15] The NBC television program on CBW, broadcast on February 4, 1969, evidently created a dramatic public awareness of these hazards, something that the years of educational efforts by such scientists as Matthew Meselson of Harvard, S. E. Luria of M.I.T., and Carl-Goran Hedén of Stockholm had failed to produce.[16]

Responding largely to questions provoked by American policies, the

[12] *See especially* CARNEGIE ENDOWMENT, *supra* note 2.

[13] HERSH, *supra* note 9.

[14] R. MCCARTHY, THE ULTIMATE FOLLY (1969).

[15] The Congressional Research Service of the Library of Congress has issued two valuable reports: M. CARLIN & F. QUIMBY, CHEMICAL AND BIOLOGICAL WARFARE: SOME QUESTIONS AND ANSWERS (1969); and J. MCCULLOUGH, CHEMICAL AND BIOLOGICAL WARFARE: ISSUES AND DEVELOPMENTS DURING 1970 (1971).

[16] For a transcript of the NBC documentary, see 115 CONG. REC. 1840–41 (daily ed. Feb. 19, 1969).

United Nations General Assembly commissioned a study on CBW by an international group of experts. Released on June 30, 1969, this report[17] signalled a renewed interest in every aspect of CBW, which was embodied in urgent demands to the Conference of the Committee on Disarmament in Geneva to give a high priority to CBAC in its further deliberations.

Faced with these pressures, President Nixon ordered a review of the American posture on CBW soon after coming into office. His advisors advocated adherence to the former policies on the use of nonlethal agents in Vietnam. However, on November 25, 1969, President Nixon announced that the United States would adhere to the Geneva Protocol, subject to an interpretation which omitted tear gas and herbicides from its proscriptions, and that he would resubmit the Protocol to the Senate for belated ratification.[18] Furthermore, he renounced biological weaponry in any form. The Geneva Protocol merely forbade the first use of BW, but henceforth American policy would eschew even retaliatory use. The President also announced a commitment to suspend further development work in BW, to destroy existing stockpiles, and to join the United Kingdom in diplomatic efforts to negotiate a comprehensive anti-BW treaty which would bind other nations to a similar policy.

At the time of Nixon's announcement, it appeared as if this decisive step of unilateral disarmament might actually complicate diplomatic negotiations in an era where "bargaining chips" were asserted to be an essential currency. However, any other policy might have left the door open to recurrent battles within the domestic cockpits of defense policy.

Indeed, even this dramatic statement left a zone of confusion. By any precise, technical criterion, toxins are certainly chemical compounds rather than living biological agents. Toxins are especially apt for CW use by virtue of their extraordinary potency: a billion lethal doses per pound, if inhaled.[19] The Army therefore believed it had an unimpaired mandate to continue toxin research and development. However, at the present stage of technology, toxins are produced as by-products of bacteria growth; it would be impossible to sustain a credible limitation on biologicals if secret work on toxins went on, regardless of the technicalities of definition. In order to sustain the policy of BW-renunciation, Mr. Nixon therefore extended the proscription to include toxins on February 14, 1970.

[17] UNITED NATIONS, CHEMICAL AND BACTERIOLOGICAL WEAPONS AND THE EFFECTS OF THEIR POSSIBLE USE—REPORT OF THE SECRETARY-GENERAL (1969). Also reprinted in *CBW Hearings*, *supra* note 2.

[18] CARNEGIE ENDOWMENT, *supra* note 2, at 1. Excerpts from the President's message are reprinted in the Appendix, *infra*.

[19] WORLD HEALTH ORGANIZATION, *supra* note 2, at 41–44.

The formal resubmission of the Protocol to the Senate was delayed until August 19, 1970, doubtless owing to continued conflicts about the exemption of tear gas and herbicides. In his letter of transmittal,[20] Secretary of State William P. Rogers advocated that the United States reserve a right of reprisal, similar to the reservations of most other parties, but only with respect to CW. He also recorded the "understanding" that riot-control agents and herbicides as well as smoke, flame, and napalm, were outside the scope of the Protocol. This exemption has been sharply criticized by Senator Fulbright and other influential senators, and the Protocol remains under consideration by the Senate Foreign Relations Committee.[21]

The legal standing of the possible use of nonlethal agents by other countries party to the Protocol remains utterly confused in the absence of a formal adjudication. For example, would the use of tear gas against rioting prisoners-of-war legalize a retaliatory response with nerve gas? On December 16, 1969, the General Assembly of the United Nations condemned "all chemical weapons" by a substantial majority vote.[22] However, many of the countries represented therein have yet to accede to the Protocol themselves, and the Assembly action has more political than legal force. If other countries, or even the United States alone, were to make a specific formal reservation[23] that nonlethal agents were indeed covered by the Protocol, it would clarify the situation greatly. This has not been done even by nations who are the severest critics of the United States, nor is it likely to be done, so long as the confusion increases our embarrassment. After the final disengagement of the United States from Vietnam, it may be possible to make a fresh start in defining international agreements to bar these weapons, perhaps as a sequel to the pending BW treaty, without the conflicting linkages to regional problems.

C. *Development of the 1971 Biological Warfare Treaty*

The Conference of the Committee on Disarmament, meeting in Geneva, began serious consideration of new proposals concerning CBAC in the summer of 1969, in response to the United Nations studies and recommendations. From the outset, the Soviet bloc insisted on a com-

[20] Quoted in CARNEGIE ENDOWMENT, *supra* note 2, at 1.

[21] The hearings before the Senate Foreign Relations Committee have not been published as of this writing, but presumably will contain the fullest documentation of official United States actions during 1970–71.

[22] HOUSE SUBCOMM. ON NATIONAL SECURITY POLICY AND SCIENTIFIC DEVELOPMENTS OF THE COMM. ON FOREIGN AFFAIRS, CHEMICAL-BIOLOGICAL WARFARE: U.S. POLICIES AND INTERNATIONAL EFFECTS (1970).

[23] The term "reservation" is used in a technical sense to imply that the matter in question is understood to be formally incorporated in the treaty unless other parties enter official objections.

prehensive ban on both CW and BW, but with no provision for substantial verification. The United Kingdom, joined after November 1969 by the United States, responded with a draft treaty that gave separate consideration to BW. This, in effect, asked other countries to adhere to the same BW policies that were unilaterally implemented by the United States and, in part, by its allies. CW, on the other hand, had already proven to be a significant instrument in warfare; and large stockpiles of nerve gas with significant military utility might be concealed in the face of agreements that did not provide for verification. Under these conditions, the argument went, such a treaty would constitute one-sided disarmament on the part of the more open societies of the West.[24] This would encourage chemical warfare by offering irresistible incentives to closed-society nations to continue clandestine accumulation of chemical weapons for eventual use in surprise attacks.

BW offered similar hazards of concealed stockpiles; however, it had never been realistically tested under field conditions, nor was this likely to occur, except in actual war. The Western powers were willing to take the risk of clandestine evasions of a treaty for the sake of forestalling an incipient technology race that would lead, inevitably, to the development and spread of such weapons.

The Soviet bloc response was, predictably, that adherence to treaties was a political rather than a technical responsibility. Each country had the duty to live up to its own agreements; if the United States refused to ban the stockpiling of nerve gas, this must mean that it had the intention of using it, as it had used other agents in violation of the Geneva Protocol. To ban BW alone, argued the Soviets, would be to legitimize CW and undo the good work of the Protocol.

This impasse continued through the 1970 sessions of the conference. On March 30, 1971, however, the Soviet delegation unveiled a new proposal for BW that converged with the Anglo-American proposals. The conference, after further discussion, was then able to forward a consensual draft treaty[25] to the United Nations on September 30 for final action during the current session.

The forces that led to the willingness of the Soviet Union to accept this approach remain obscure. They may have felt that they had exhausted the propaganda utility of harassing the United States over Vietnam at a time of progressive disengagement. They may have predicted

[24] The use of the terms "open societies" and "closed societies" is intended to distinguish between those countries that do and those that do not exhibit public criticism of government policies, treaty commitments, and the like. There are some countries in which an effective Seymour Hersh-like figure is inconceivable.

[25] Excerpts from this treaty are reprinted in the Appendix, *infra*.

that their own intransigence would eventually be perceived as blocking the possibility of even a limited BW treaty. They may have undergone a shift in their own strategic thinking about the utility of CW and therefore become less willing to close that option for themselves.

Larger political considerations are, however, more likely. The shift at Geneva accompanied Secretary Brezhnev's address to the 24th Communist Party Congress, at which he also announced a number of other initiatives designed to bolster European security agreements and to reach basic accord with the United States and China. A few days later, Peking dramatized its new policies of accommodation with the United States, with its famous invitation to the table tennis team—an invitation which would culminate in President Nixon's visit. Whatever foreknowledge the Kremlin may have had about these moves, it obviously faced a new world environment in which it might have to choose between conciliation with the West or isolation from an emerging Sino-Western bloc.

In any event, the draft BW convention is before the United Nations at this writing. It is likely to face continued criticism for being limited to BW, especially from some smaller, nonaligned nations who may view this as a Soviet-American conspiracy to retain dominion over the more creditable CW. The United States has already proceeded with the actual destruction of BW stocks, and with the conversion of the laboratory facilities at Fort Detrick, Maryland, and Pine Bluff, Arkansas, for open work in environmental pollution, drug safety, and cancer research. The Soviets have released no comparable information on their BW program, but a spokesman has asserted that they would, of course, abide by the provisions of the treaty when it is ratified and other nations have done likewise.[26]

The role of China in these agreements must be considered in light of her historic isolation from the main currents of international discourse. China's exclusion has, of course, generated insuperable problems for global arms control in a multi-polar environment. Its implications for SALT are all too evident; in CBAC, one wonders how durable any agreement would be if the Chinese elected to proceed with large-scale experiments in BW. This type of catalytic disruption of Western-Soviet arms control arrangements has, however, no evident advantages and many potential disadvantages to the Chinese. China's adherence to the new BW treaty could well be one of its first effective acts as a voting member of the world community.

As for the United States, the chief impediment to the adoption of the BW treaty is its many references to the Geneva Protocol, embarrassing

[26] Hamilton, *A Stronger Pact Set on Germ War*, N.Y. Times, Sept. 29, 1971, at 1, col. 1.

reminders of the delay in American ratification. The references to the Protocol have no operational significance; that is to say, the present treaty itself comprises a complete bar to any possession of BW by any party, whether or not that party accedes to the Geneva Protocol as well. However, the cross-references may have some effect on the Senate's process of consent. The Senate Foreign Relations Committee, having already delayed ratification of the Protocol in order to force inclusion of nonlethal CW, will have additional leverage on the President through including the BW treaty in its considerations. These tactics may be reinforced if some countries balk at ratifying the BW treaty before the United States has ratified the Protocol.

III. ANALYSIS OF THE 1971 BW DRAFT TREATY (BW-71)

The Geneva Protocol of 1925, it will be recalled, was a multilateral contract, binding the parties among themselves, not to initiate the use of CW or BW. BW-71 is a joint abjuration—each party promises "never in any circumstances to develop, produce, stockpile or otherwise acquire or retain" BW, including microbes, toxins, or associated delivery equipment. It makes no reference to *use*, a provision adamantly rejected by the Soviet Union on the grounds that use was already proscribed by the Geneva Protocol. This may constitute a mischievous loophole. BW-71 defines biological weapons as "biological agents . . . of types and in quantities that have no justification for prophylactic, protective, or other peaceful purposes." Just as with tear gas, one can visualize the emergence of biological agents that *do* have legitimate peacetime uses and can also be used in war. Would the military *use* of such an agent be legitimized *under the reprisal provisions of the Geneva Protocol*, its possession being outside the scope of BW-71?

Earlier drafts incorporated a precise definition of a biological agent as one "causing death, damage, or disease by infection or infestation, to man, other animals, or crops."[27] This definition was first dropped simply to accommodate toxins, which poison but do not infect or infest their targets. Eventually, the section was dropped altogether. The unqualified phrase, "biological agent," can have many interpretations, however, and the ambiguities may lead to future trouble unless a clearcut "legislative history" is established during the final deliberations. (Man himself is certainly a biological agent; but he may be excused on a claim of potential peaceful purposes.)

A sane reader will have understandable revulsions toward technical plans for future wars which will be very costly if they are ever fought.

[27] CARNEGIE ENDOWMENT, *supra* note 2, at 99.

However, the military must have clear guidelines to discharge their responsibilities for national defense, and these must take realistic account of the capabilities of probable adversaries. Confusion about the contractual limitations that each side has accepted in CBAC arrangements can only feed a mutual paranoia about each other's intentions. This is not to suggest that formal restraints are the only, or even the most important, devices to forestall technological escalations. If either side presses permissible, or formally nonforbidden, developments to the very limit of the contractual agreements, the agreements themselves may not prove very durable. This is of course the strategic hazard of large-scale use of nonlethal chemicals, whatever their status under the Geneva Protocol. Such use would certainly be even more provocative if it were an unambiguous violation.

BW-71 makes no provision for verification, except for the promise in Article V to consult one another about problems that may arise. Violations are to be reported to the Security Council, where, of course, any permanent member could veto any proposed action. The superseded British draft would have directed complaints to the Secretary-General for investigation, thus guaranteeing consideration by the General Assembly regardless of the formal actions of the Security Council.

The principal recourse of an aggrieved party, if the Security Council is divided, will be to withdraw from the treaty, as authorized by Article XIII, on three months notice. Insofar as the superpowers place some utility on the pattern of stability achieved by BW-71, they may discourage violations even in the face of local advantages to one of their allies. As we have seen with the Geneva Protocol, the treaty also establishes a moral standard whose value, independent of the legal force of the agreement, increases the longer it is respected.

Article XII does assure continued attention to technical innovations, providing for a conference after five years. This clause is also intended to sustain explorations about CW, which BW-71 leaves in abeyance.

The main practical effect of BW-71 will be to deflate the pressures for a sustained biological weapons race by the superpowers, and to discourage dangerous adventures by smaller states. By distinguishing BW from CW, it also affords another firebreak, should restraints on CW continue to deteriorate. On the other hand, some critics deplore the uncoupling of BW from CW: by reducing the stakes of chemical arms control failure, it may render such failure more likely to occur. This ambivalence, or rather tradeoff, is typical of firebreak strategies.[28]

[28] The firebreak concept (see text at note 30, *infra*) is closely allied to the "focal point" elaborated especially by T. SCHELLING, THE STRATEGY OF CONFLICT (1960). The difficulty of communication between mutually suspicious adversaries complicates the enforcement of arms

Microbiologists who have viewed BW as an apocalyptic threat have encouraged this early, albeit separate, BW treaty. We are especially concerned that advances in molecular biology may open the door to the development of weapons that would be of questionable reliability, but relatively inexpensive and potentially capable of spreading disease throughout the species. These characteristics are not only maleficent in themselves—nothing could be more threatening to the political stability of the world order—but they would also invert the moral imperatives of the health professions and of the medically oriented research institutions on which the advance of world health is founded.

BW-71 does not solve all of these problems. Scientific advances in microbiology, though directed to preventing disease in man and in his crops, will inevitably uncover new technical options that might be subverted as BW. Some of these may afford irresistible temptations to a militant movement lacking in other resources by which to impress its political will. They may lend themselves to economic sabotage (e.g., to wipe out a competitor's crop of coffee or sugar), to catalysis of conflicts between nations, and, in turn, to provocative suspicions of such Byzantine maneuvers and possible misinterpretations of natural catastrophes. BW-71 does not proscribe research on potential BW agents, even by the military, so long as this can be justified as bearing on "prophylactic, protective or other peaceful purposes." Such justifications legitimately inhere in any basic work on microbes, and there is no doubt that all countries will continue some research whose ultimate purposes and intentions, being unstated, will be open to question.

We have, then, two grave problems—to deter technological efforts that will in fact lead to BW, and to placate suspicions that such efforts are taking place. No practical system of specific verification has been suggested. The level of international inspection that would be needed to monitor a country's total efforts in microbiology would be unacceptable

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control agreements. Each side may be willing to exchange some risk of technical disadvantage or surprise for manifest evidence of the adversary's policies, intentions and capabilities, which provide mutual enhancement of the management of an uncertain future. In the absence of symbolic focal points, each incremental step by one side is subject to a wide zone of interpretation by the other, and may elicit a reaction disproportionate to the actual provocation.

A doctrine like "Gas is gas," as discussed by Schelling, is less likely to lead to mutual escalation in response to small fluctuations than one which requires elaborate technical analysis to categorize each incident. The firebreak here amounts to the proposition that "So long as neither of us uses *any* chemicals in war, this is clear evidence that we do not intend to pursue the major deployment of CW to a degree that you need ever worry about." The converse implication, however, is the signal that were a chemical ever to be used, the adversary should take this as a trigger for his own escalation, no longer being able to predict the other's intentions.

Diplomatic communication may be expected to be more precise, but the effective communication of ideologies and policy intentions among the populaces of the nations does seem to fall back on simplistic sloganeering.

to any country. (Prohibition in the United States did a poor job of deterring illicit microbial fermentation processes, namely the production of alcohol—a compound that loosely fits the label of "toxin.") However, medical research is already established as one of our nearly universal institutions. A strong positive step to assure accurate intelligence about the character of microbiological research in other nations would be the strengthening of cooperative *international* programs on world health problems. Since global health problems are already so grave, little additional justification would be required to implement multinational health research programs. "Natural infection" is an immanent BW against our own species; health-oriented research may also provide barriers against the spread of disease initiated by human enemies.

This article has focused on political rather than hygienic issues, but the stakes are too large to pass the latter by. We have no guarantee that we will not face another natural epidemic comparable to the Black Death of the 14th century. Our international institutions, such as the World Health Organization (WHO), have done excellent work in checking smallpox and malaria. They were hindered in coping with cholera because of failures in national cooperation and for lack of funds. WHO was virtually helpless in attempting to respond to the last epidemic of Asian influenza, and it is only our good fortune that the epidemic was not a thousandfold more virulent.

If ever implemented, the pious language of Article X may be the most important contribution of BW-71. It exhorts all "parties . . . in a position to do so . . . [to] cooperate in contributing . . . to the further development and application of scientific discoveries in the field of biology for prevention of disease. . . ."

IV. Chemical Warfare in Limbo

While BW has not emerged as a weapon of modern war, the historical record for CW is far less promising. As discussed above, although the major powers all refrained from the use of poison gas during World War II, its deployment was given serious consideration on several occasions.[29] There can be little doubt that it would have been used during the latter stages of the conflict had it been perceived as playing a decisive strategic role.

In any event, it would be futile to expect C or BAC to withstand the rage of serious world conflict. The most efficacious way to prevent CW is to strengthen the institutions of world order and prevent war. Still, the availability of technically advantageous weapons may work against peace-

[29] Brown, *supra* note 6.

maintenance and we would hardly be justified in abandoning efforts at controlling CW as one brick in the peace-building edifice. The technical characteristics of chemical weaponry pose many difficult obstacles to their control by treaty. They require a fussy attention to detail which is incongruent with the sweeping rejection of CW by the public.

The Geneva Protocol, with its restrictions on the first-use of CW, is an obvious starting point for further negotiation. At the moment, diplomatic progress is impeded by the quarrels over the extent to which the use of nonlethal chemicals is already proscribed by the Protocol. One of the uncommitted nations could play a constructive role as mediator by pressing for diplomatic discussions which could focus on this point as an area of de novo agreement. In the light of the use of tear gas as an alternative to lethal riot-control techniques by the civil police, the definition of "use in war" will require careful elaboration, for the whole edifice may collapse over an ambiguous incident.

The military authorities will still have to be convinced that the abjuration of these weapons is cost-effective. They suffer from the disadvantage of having to plan for many contingencies that, at any moment, may be beyond the public imagination. The pitfall is, of course, that the very act of protective planning may constitute a self-fulfilling prophecy.

One of the main policy arguments for abjuring tear gas is the "firebreak" concept,[30] also labeled "gas is gas." According to this doctrine, the deployment of nonlethal CW is likely to provoke a set of escalating reactions involving the use of increasingly toxic agents. Furthermore, the defenses against these weapons—gas masks, etc.—will be similar to those needed for protection against lethal weapons. In the absence of any very sharp dividing line between lethal and nonlethal weaponry in a military context, the end result will be unrestrained CW. Therefore, including the entire domain of chemical weapons in any treaty ban would create a more effective firebreak.

The empirical evidence of this theoretical concept is ambiguous. The use of herbicides and of tear gas in Vietnam did not result in the expected reaction; but this can hardly be taken as a reliable precedent for future conflicts.

From a purely technical standpoint, one might argue that a tradition has already been established that would distinguish between tear gas (CN or CS) on the one side and nerve gas on the other. This distinction is not intended to legitimize tear gas, but to create a hope that a world which has already seen this restricted form of chemical warfare may yet evade the horror of large-scale civilian casualties from nerve gas. The

[30] CARNEGIE ENDOWMENT, *supra* note 2, at 58.

expected military utility of tear gas is inescapably linked to the contingency of American involvement in protecting existing governments from revolutionary challenges. For bargaining purposes, one might attempt to link a ban on tear gas with effective sanctions against insurgent terrorism; but this utopian phantasy is mentioned only to illustrate the political dimensions of a problem labeled as chemical arms control.

The use of herbicides in Vietnam was perhaps even more offensive to world opinion than that of tear gas. Its rapid escalation illustrates the problem of sustaining effective firebreaks. It would have been difficult to make a strong case against the clearing of forest cover in the immediate perimeter of a military base. But no firm line of restraint could be found between this, clearing roadsides for protection against ambush, clearing forests to expose Vietcong concentrations, and the denial of food supplies in violation of long-established conventions.[31]

The underlying issue of environmental warfare would not, however, be solved even by the most rigorous interpretation of the Geneva Protocol. In response to public protest, the use of chemical herbicides in Vietnam has already been sharply restricted, only to be supplanted by heavy earth-moving equipment. "Conventional weapons" like bombs have undoubtedly scarred the Vietnamese environment more seriously than herbicides have, quite apart from the human dimensions involved. Deepened sensitivity to the depredation of the environment may help to establish a more realistic assessment of the costs of military "solutions" to world problems. Further diplomatic discussions about environmental protection may be more useful, if sharply focused on the end results, than futile bargaining about the style of warfare.

Lethal chemicals, like nerve gas, are unambiguously condemned by the Geneva Protocol, although only with respect to their initial use. This level of proscription demands very little by way of inspection procedures, if we overlook the hindrances to the verification of alleged uses of poison gas, as, for example, in Yemen. The routinization of appeals to the United Nations Security Council for the investigation of such incidents may be of some help, despite the possibility of a veto, since an obstruction to local investigation would be almost tantamount to acknowledgment of guilt. Although this procedure is not formally established even in BW-71, it may still be utilized in the future, and that possibility may help to deter such experiments. In past years, Soviet spokesmen have insisted that the Geneva Protocol was self-implementing; but it may still be possible to negotiate more effective implementation under the general aegis of BW-71.

[31] D. Brown, *The Use of Herbicides in War: A Political/Military Analysis*, in CARNEGIE ENDOWMENT, *supra* note 2, at 39.

The next level of prohibition that might be considered would be a ban on any use of CW. This has not received much formal discussion. Such a ban might be resisted on the Western side because of a fear that it would be transformed through domestic politics into a system of unilateral chemical disarmament, with no check whatever on the capability for violation by authoritarian states. The Anglo-American position has been that a battle-proven weapons system, like poison gas, should not be given up unilaterally, since this would destroy the incentive of the other side to bargain to do likewise. Advance promises not to use a particular weapon in the future are useful mainly for their arms control side effects in the near term.

Proposals for mutual chemical disarmament have foundered on the ancient shoals of verification. These difficulties are compounded by the problem of definition, since so many potential CW agents are also articles of peacetime commerce. It may suffice to point out that many widely used pesticides are far more toxic than the "poison gases" of World War I and that nerve gas was discovered and refined as a by-product of pesticide development. It follows that any industrial state that maintains delivery systems, like bombers, can readily maintain a substantial CW capability. The most potent agents pose some technical challenges for safe handling: witness the embarassment of the United States Army in transferring and disposing of its obsolescent stocks of chemical munitions. However, the well-advertised concept of binary chemical munitions has already breached that barrier.[32]

Mutually rewarding arrangements for CW disarmament will not, then, be easily arrived at. Positive steps may still be sought to make first-use of CW, in violation of the Geneva Protocol, less profitable. Political arrangements, such as facilitative assistance from the United Nations, may be the most important. In addition, the smaller nonaligned countries who may well feel most threatened by the continued capability for CW on the part of the superpowers, might be reassured by being invited to participate in international programs for CW-monitoring and alarm systems, and civil defense protections against CW attack.[33] These cooperative defense efforts might make such attacks less rewarding from a military standpoint, with useful reverberations back down the entire policy chain. This proposal is a precise counterpart of the expansion of world health activities against infectious disease and may also have civilian

[32] Binary CW refers to a system by which two reagents, themselves nontoxic, are mixed to produce nerve gas within a missile only after it has been enabled and fired. The reagents could be handled by conventional chemical industrial facilities, bypassing the elaborate safety precautions that might have earlier required a nerve gas plant.

[33] C.-G. Hedén, *Defences Against Biological Warfare*, 21 AM. REV. MICROBIOLOGY 689–76 (1970).

by-product advantages in combatting other forms of environmental pollution.

APPENDIX

I. 1971 BW Draft Treaty

DRAFT CONVENTION ON THE PROHIBITION OF THE DEVELOPMENT, PRODUCTION AND STOCKPILING OF BACTERIOLOGICAL (BIOLOGICAL) AND TOXIN WEAPONS AND ON THEIR DESTRUCTION[34]

The States Parties to this Convention,

Determined to act with a view to achieving effective progress towards general and complete disarmament including the prohibition and elimination of all types of weapons of mass destruction, and convinced that the prohibition of the development, production and stockpiling of chemical and bacteriological (biological) weapons and their elimination, through effective measures, will facilitate the achievement of general and complete disarmament under strict and effective international control,

Recognizing the important significance of the Geneva Protocol of 17 June 1925 for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, and conscious also of the contribution which the said Protocol has already made, and continues to make, to mitigating the horrors of war,

Reaffirming their adherence to the principles and objectives of that Protocol and calling upon all States to comply strictly with them,

Recalling that the General Assembly of the United Nations has repeatedly condemned all actions contrary to the principles and objectives of the Geneva Protocol of 17 June 1925,

Desiring to contribute to the strengthening of confidence between peoples and the general improvement of the international atmosphere,

Desiring also to contribute to the realization of the purposes and principles of the Charter of the United Nations,

Convinced of the importance and urgency of eliminating from the arsenals of states, through effective measures, such dangerous weapons of mass destruction as those using chemical or bacteriological (biological) agents,

Recognizing that an agreement on the prohibition of bacteriological (biological) and toxin weapons represents a first possible step towards the achievement of agreement on effective measures also for prohibition

[34] Excerpts from typewritten manuscript circulated by the Conference of the Committee on Disarmament, Doc. No. CCD/353, Sept. 28, 1971 (copy on file in the office of the Stanford Journal of International Studies). [See supplementary note on p. 44.—Ed.]

of the development, production and stockpiling of chemical weapons, and determined to continue negotiations to that end,

Determined, for the sake of all mankind, to exclude completely the possibility of bacteriological (biological) agents and toxins being used as weapons,

Convinced that such use would be repugnant to the conscience of mankind and that no effort should be spared to minimize this risk,
Have agreed as follows:

Article I

Each State Party to this Convention undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain:

(1) Microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes;

(2) Weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.

Article II

Each State Party to this Convention undertakes to destroy, or to divert to peaceful purposes, as soon as possible but not later than nine months after the entry into force of the Convention all agents, toxins, weapons, equipment and means of delivery specified in Article I of the Convention, which are in its possession or under its jurisdiction or control. In implementing the provisions of this Article all necessary safety precautions shall be observed to protect populations and the environment.

Article III

Each State Party to this Convention undertakes not to transfer to any recipient whatsoever, directly or indirectly, and not in any way to assist, encourage, or induce any State, group of States or international organizations to manufacture or otherwise acquire any of the agents, toxins, weapons, equipment or means of delivery specified in Article I of the Convention.

Article IV

Each State Party to this Convention shall, in accordance with its constitutional processes, take any necessary measures to prohibit and prevent development, production, stockpiling, acquisition or retention

of the agents, toxins, weapons, equipment and means of delivery specified in Article I of the Convention, within the territory of such State, under its jurisdiction or under its control anywhere.

Article V

The States Parties to the Convention undertake to consult one another and to co-operate in solving any problems which may arise in relation to the objective of, or in the application of the provisions of, this Convention. Consultation and co-operation pursuant to this Article may also be undertaken through appropriate international procedures within the framework of the United Nations and in accordance with its Charter.

Article VI

(1) Any State Party to the Convention which finds that any other State Party is acting in breach of obligations deriving from the provisions of this Convention may lodge a complaint with the Security Council of the United Nations. Such a complaint should include all possible evidence confirming its validity, as well as a request for its consideration by the Security Council.

(2) Each State Party to the Convention undertakes to co-operate in carrying out any investigation which the Security Council may initiate, in accordance with the provisions of the United Nations Charter, on the basis of the complaint received by the Council. The Security Council shall inform the States Parties to the Convention of the results of the investigation.

Article VII

Each State Party to the Convention undertakes to provide or support assistance, in accordance with the United Nations Charter, to any Party to the Convention which so requests, if the Security Council decides that such party has been exposed to danger as a result of violation of this Convention.

Article VIII

Nothing in this Convention shall be interpreted as in any way limiting or detracting from the obligations assumed by any State under the Geneva Protocol of 17 June 1925 for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare.

Article IX

Each State Party to this Convention affirms the recognized objective of effective prohibition of chemical weapons and, to this end, undertakes to continue negotiations in good faith with a view to reaching early agreement on effective measures for the prohibition of their development, production and stockpiling and for their destruction, and on appropriate measures concerning equipment and means of delivery specifically designed for the production or use of chemical agents for weapons purposes.

Article X

(1) The States Parties to the Convention undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes. Parties to the Convention in a position to do so shall also co-operate in contributing individually or together with other States or international organizations to the further development and application of scientific discoveries in the field of bacteriology (biology) for prevention of disease, or for other peaceful purposes.

(2) This Convention shall be implemented in a manner designed to avoid hampering the economic or technological development of States Parties to the Convention or international co-operation in the field of peaceful bacteriological (biological) activities, including the international exchange of bacteriological (biological) agents and toxins and equipment for the processing, use or production of bacteriological (biological) agents and toxins for peaceful purposes in accordance with the provisions of this Convention.

Article XI

Any State Party may propose amendments to this Convention. Amendments shall enter into force for each State Party accepting the amendments upon their acceptance by a majority of the States Parties to the Convention and thereafter for each remaining State Party on the date of acceptance by it.

Article XII

Five years after the entry into force of this Convention, or earlier if it is requested by a majority of Parties to the Convention by submitting a proposal to this effect to the Depositary Governments, a conference of

States Parties to the Convention shall be held at Geneva, Switzerland, to review the operation of this Convention, with a view to assuring that the purposes of the preamble and the provisions of the Convention, including the provisions concerning negotiations on chemical weapons, are being realized. Such review shall take into account any new scientific and technological developments relevant to this Convention.

Article XIII

(1) This Convention shall be of unlimited duration.

(2) Each State Party to this Convention shall in exercising its national sovereignty have the right to withdraw from the Convention if it decides that extraordinary events, related to the subject matter of this Convention have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other States Parties to the Convention and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.

II. Geneva Protocol of 1925

PROTOCOL FOR THE PROHIBITION OF THE USE IN WAR OF ASPHYXIATING, POISONOUS OR OTHER GASES, AND OF BACTERIOLOGICAL METHODS OF WARFARE[35]

The undersigned Plenipotentiaries, in the name of their respective Governments:

Whereas the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilised world; and

Whereas the prohibition of such use has been declared in Treaties to which the majority of Powers of the world are Parties; and

To the end that this prohibition shall be universally accepted as a part of International Law, binding alike the conscience and the practice of nations;

Declare:

That the High Contracting Parties, so far as they are not already Parties to Treaties prohibiting such use, accept this prohibition, agree to extend this prohibition to the use of bacteriological methods of warfare and agree to be bound as between themselves according to the terms of this declaration.

[35] Excerpts from the Geneva Protocol of June 17, 1925, 94 L.N.T.S. 65; the text is also reprinted in Carnegie Endowment, *supra* note 2, at 125.

III. PRESIDENT NIXON'S MESSAGE

WHITE HOUSE PRESS RELEASE DATED 19 AUGUST 1970[36]

To the Senate of the United States:

With a view to receiving the advice and consent of the Senate to ratification, I transmit herewith the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva June 17, 1925. I transmit also the report by the Secretary of State which sets forth the understandings and the proposed reservation of the United States with respect to the Protocol.

In submitting this Protocol for approval, I consider it desirable and appropriate to make the following statements:

—The United States has renounced the first-use of lethal and incapacitating chemical weapons.

—The United States has renounced any use of biological and toxin weapons.

—Our biological and toxin programs will be confined to research for defensive purposes, strictly defined. By the example we set, we hope to contribute to an atmosphere of peace, understanding and confidence between nations and among men. The policy of the United States Government is to support international efforts to limit biological and toxin research programs to defensive purposes.

[36] Excerpts from the message appear here; the full text may be found in CARNEGIE ENDOWMENT, *supra* note 2, at 129.

[The Treaty on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction was signed simultaneously in Washington, London, and Moscow on April 10, 1972, in language largely identical to that of the draft treaty presented here. Almost all members of the United Nations have signed it, or have indicated their intention of adhering to it upon the completion of formalities dictated by internal law. The principal exceptions are China and France. China has not yet commented; France has indicated its intention of adhering to the spirit of the new treaty without undertaking a formal international commitment lacking provisions for verification. Neither the BW Treaty nor the Geneva Protocol has yet been acted upon by the United States Senate Foreign Relations Committee.—ED.]